

Other factors in the lung cancer mystery continued to receive press attention.

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## Medical Report

# New Evidence Is Offered Linking Cancer, Viruses

The growing suspicion that viruses are the cause of some—if not all—human cancer was strengthened here yesterday in a number of reports presented before the annual meeting of the American College of Surgeons.

The best evidence so far is included in studies showing that materials from human cancers—which are judged to be viruses because they do not contain known cancer cells—cause malignant tumors in mice.

Now Dr. James T. Grace, from the Roswell Park Memorial Institute, in Buffalo, has shown that:

1—Material from normal organs in mice which originally received the presumed human cancer viruses will induce cancers in other mice.

2—Large numbers of what are believed to be viruses can be seen in such mouse tumors under the electron microscope.

3—Presumed viruses from both the induced mouse tumors and from the human cancers will produce cancer in newborn mice, not otherwise susceptible to malignancies.

These other reports on cancer were highlights of the day's program:

A drug formerly used to rid the body of worms and as a treatment for syphilis and gout has proved in animals to be significantly superior to nitrogen mustard, widely used anti-cancer chemical.

Dr. Alan Davies of the University of Illinois said he had tested the drug, a derivative of piperazine, in rats and dogs and was now seeking a non-toxic dosage which might be

used in humans in the terminal stages of cancer.

Cigarettes—not smog—were indicated again as a possible cause of lung cancer in a report delivered by Dr. Philip Cooper of the Bronx Veterans Administration Hospital.

Smoke from cigaret tobacco and from cigaret paper produced severe toxic changes when injected into embryonic lung tissue and cells cultured from other human organs, he reported.

The cigaret companies, trying to stave off growing evidence of a definite link between smoking and lung cancer, have been trying to shift the blame to air pollutants.

Two different reports told how the anti-cancer effectiveness of nitrogen mustard—which tends to destroy cancer cells at a faster rate than benign cells—is enhanced by other chemicals.

Dr. Robert F. Ryan of Tulane University said that nitrogen mustard "primed" with colchicine—a useful drug in gout—produced a 20 per cent cancer cure rate in mice, compared with a 3 per cent rate in those treated with the nitrogen mustard alone.

Dr. Charles A. Ross of the Roswell Park Memorial Institute said he and his co-workers had shown that sodium thiosulfate given previous to nitrogen mustard served as a protection agent against the toxic effect of this highly poisonous material.

Of six dogs so protected, all survived heavy nitrogen mustard treatment; among four not protected, three died and the fourth was very ill.

In two terminal cancer patients use of the protective drug prevented such side-effects of nitrogen mustard treatment as destruction of white blood cells and platelets (the part of the blood that initiates coagulation) and heavy vomiting and nausea.

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## Virus May Be Cancer Cause

Deeper scientific familiarity with that versatile mouse virus, polyoma, is throwing brighter lights on the possibility of viruses being a major cause of cancers in people.

The newest of the brighter lights shine on a principal objection to the virus theory of human cancers. It's a fact that viruses cause cancers in fowl and laboratory animals; yet if it's a fact for people, how come a virus connection has never been established for even one type of human cancer? And why aren't there more human cancers and why isn't cancer a transmissible disease?

If you believe all viruses must behave more or less alike those questions are stoppers. The viruses we know about get around among us rather freely; the diseases they cause are transmissible.

However, science believes nothing it can't prove. There are many viruses which await discovery, and science can't prove anything about their behavior or anything else about them as long as they are unknown.

Now, to get back to that versatile mouse virus, polyoma. It was discovered a few years back at the National Cancer Institute, Bethesda, Md. Once it gets into a mouse it is almost certain to cause cancer. Even more startling, it causes not just one kind of cancer but many kinds.

Since then samples of polyoma have been distributed among virologists throughout the world. Naturally, all those scientists long for a familiarity with a virus so

versatile—and so deadly. These many studies have produced a number of brighter lights.

The newest came from a laboratory of the Weizmann Institute of Science, Rehovoth, Israel. There, in culture dishes, Drs. Leo Sachs and Dan Medina established a stable relation between multiplying mouse cells and polyoma viruses.

That is, the viruses use the mouse cells to multiply themselves, in the viral way, but without destroying the cells. This has been going on for over a year now, with cells and viruses living together in apparent harmony.

These viruses clearly are mutants of their killer-forbears. Polyoma on its own took a form in which it makes mouse cells abnormal in that they can work with viruses and still save their lives. Drs. Sachs and Medina have now put the apparent harmlessness of these polyoma viruses to the acid test.

They took viruses from dishes and injected them into new born mice of a strain highly susceptible to polyoma—so susceptible, in fact, cancers appear quickly in 100 per cent of these mice which are injected with wild polyoma. But the tamed polyoma produced cancer in only one mouse out of five—and they were the same kind of cancer.

The scientists tried tamed polyoma in hamsters which are also 100 percent susceptible to wild polyoma. Even with heavy injections, only three of 31 animals developed cancer.

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